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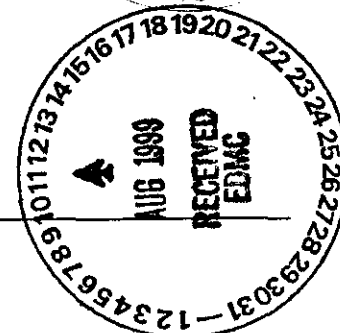
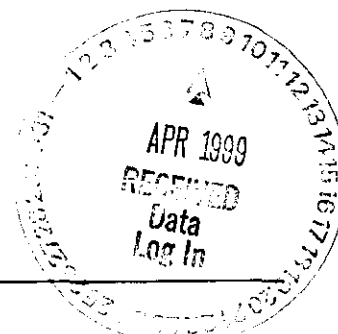
CERTIFICATE OF ANALYSIS

Bechtel Hanford, Inc.
 3350 George Washington Way
 Richland, WA 99352

April 8, 1999

Attention: Joan Kessner

SAF Number	:	B99-002
Date First Sample Received	:	February 25, 1999
Number of Samples	:	One
Sample Type	:	Soil
SDG Number	:	W02690
Data Deliverable	:	15 Day Priority



I. Introduction

On February 25, 1999 the Quanterra Environmental Services Richland Laboratory (QESRL) received one-priority soil sample for a 15-day priority radiochemical and chemical analysis. Upon receipt, the sample was assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

<u>QESRL ID#</u>	<u>BHI ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
9CR4FH10	B0TXP2	Soil	2/25/99

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical errors.

The requested analyses were:

Alpha Spectroscopy

Americium-241 by method RICH-RC-5080

Plutonium-238, -239/40 by method RICH-RC-5010

Uranium-234, -235, -238 by method RICH-RC-5030

Gamma Spectroscopy

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Gamma Scan by method RICH-RC-5017
Gas Proportional Counting
Total Strontium by method RICH-RC-5006
Liquid Scintillation Counting
Nickel-63 by method RICH-RC-5069
Chemical Analyses
Chromium Hex by EPA method 7196

III. Quality Control

The analytical results for each analysis performed under SDG W02690 includes a minimum of two Laboratory Control Samples (LCS) and one method (reagent) blank. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Alpha Spectroscopy

Americium-241 by method RICH-RC-5080

The LCS, batch blank, sample duplicate (B0TXP2) and sample results are within contractual requirements.

Plutonium-238, -239/40 by method RICH-RC-5062

The LCS, batch blank, sample duplicate (B0TXP2) and sample results are within contractual requirements.

Uranium-234, -235, -238 by method RICH-RC-5030

The LCS, batch blank, sample duplicate (B0TXP2) and sample results are within contractual requirements.

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017

The LCS, batch blank, sample duplicate (B0TXP2) and sample results are within contractual requirements.

Gas Proportional Counting

Total Strontium by method RICH-RC-5006

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The LCS, batch blank, sample duplicate (B0TXP2) and sample results are within contractual requirements.

Liquid Scintillation Counting

Nickel-63 by method RICH-RC-5069

The Id numbers on the duplicate and matrix spike had inadvertently been switched with only one sample the error was obvious and corrected. The LCS, sample duplicate (B0TXP2), matrix spike (B0TXP2), batch blank and sample results are within contractual requirements.

Chemical Analyses

Chromium Hex by EPA method 7196

The LCS, sample duplicate (B0TXP2), batch blank, matrix spike (B0TXP2) and sample results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:



Doug Swenson
Project Manager

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02690 / 7310
LAB SAMPLE ID: 9CR4FH10 **MATRIX:** SOIL
CLIENT ID: B0TXP2 **DATE RECEIVED:** 2/25/99 9:55:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	0.00E+00	U	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
AM-241	8.64E-02	J	4.0E-02	4.1E-02	2.10E-02	pCi/g	87.90%	RICHRC5080
PU-238	-9.42E-04	U	1.3E-03	1.3E-03	2.69E-02	pCi/g	70.40%	RICHRC5010
PU239/40	9.42E-03	U	1.7E-02	1.7E-02	3.32E-02	pCi/g	70.40%	RICHRC5010
AM-241	-4.91E-02	U	7.2E-02	7.2E-02	1.17E-01	pCi/g	N/A	RICHRC5017
CO-60	9.53E-03	U	1.5E-02	1.5E-02	2.77E-02	pCi/g	N/A	RICHRC5017
CS-137	1.18E-01		2.9E-02	2.9E-02	2.55E-02	pCi/g	N/A	RICHRC5017
EU-152	4.39E-01		7.7E-02	7.7E-02	6.17E-02	pCi/g	N/A	RICHRC5017
EU-154	4.92E-02	U	4.9E-02	4.9E-02	8.67E-02	pCi/g	N/A	RICHRC5017
EU-155	3.86E-02	U	4.0E-02	4.0E-02	6.79E-02	pCi/g	N/A	RICHRC5017
RA-226	6.44E-01		9.3E-02	9.3E-02	4.47E-02	pCi/g	N/A	RICHRC5017
RA-228	8.64E-01		1.5E-01	1.5E-01	8.37E-02	pCi/g	N/A	RICHRC5017
U-238DHP	1.58E+00		9.6E-01	9.6E-01	9.16E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.97E-02	U	4.8E-02	4.9E-02	1.21E-01	pCi/g	67.00%	RICHRC5006
NI-63	1.87E+00	U	9.3E-01	2.7E+00	2.17E+00	pCi/g	28.60%	RICHRC5069

Number of Results: 15

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

0005

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02690 / 7310
LAB SAMPLE ID: 9CR4FH20 MATRIX: SOIL
CLIENT ID: B0TXP2 DATE RECEIVED: 2/25/99 9:55:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
U-234	7.99E-01	J	1.3E-01	1.6E-01	3.27E-02	pCi/g	80.10%	RICHRC5030
U-235	2.62E-02	U	2.6E-02	2.6E-02	3.93E-02	pCi/g	80.10%	RICHRC5030
U-238	8.43E-01	J	1.3E-01	1.7E-01	2.82E-02	pCi/g	80.10%	RICHRC5030

Number of Results: 3

**Quanterra Data Review Checklist
RADIOCHEMISTRY**

Work Order number (st): <u>398250157</u>				
Client ID: <u>BHI</u>				
Due Date: <u>3-12-99</u>				
Lab Sample Number or SDG: <u>9059108</u>				
Method Test Parameters: <u>AMISO</u>				
Matrix: <u>Soil</u>				
Review Item	Yes (✓)	No (✓)	NA (✓)	2 nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			✓
2. Were all sample holding times met?	✓			✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples				
1. Is the blank yield within acceptance criteria	✓			✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			✓	
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria	✓			✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. MS/MSD results and yield meet acceptance criteria?			✓	
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. Other				
1. Are all Nonconformances included and noted?				
2. Are all required forms filed out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked? on 3-17-99	✓			PE ✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response: _____

First Level Review: _____

Date: 3-17-99

Second Level Review: _____

Date: 4/7/99

Form #: LS-038.2/96, Rev.4

0025

Quanterra Data Review Checklist RADIOCHEMISTRY

Work Order number/sr: 39B250157				
Client ID: RHI				
Due Date: 3-12-99				
Lab Sample Number or SDG: 9059106				
Method Test Parameter: Plutonium				
Matrix: Soil				
Review Limit	Yes (✓)	No (✓)	NA (✓)	2 nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			✓
2. Were all sample holding times met?	✓			✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples				
1. Is the blank yield within acceptance criteria	✓			✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			✓	
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	✓
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria	✓			✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. MS/MSD results and yield meet acceptance criteria?			✓	
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. Other				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filled out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked?		SM 3-18-99		PK
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response: _____

First Level Review: _____

Date: 3-18-99

Second Level Review: _____

Date: 4/5/99

Form #: LS-038.2/96, Rev. 3

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**Quanterra Data Review Checklist
RADIOCHEMISTRY**

Jan 3/21/99

Work Order number (s): <u>JACO J9B250157</u>				
Client ID: <u>BNI</u>				
Due Date: <u>3/12/99</u>				
Lab Sample Number or SDG: <u>9068182</u>				
Method Test Parameters: <u>Uranium</u>				
Matrix: <u>Soil</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			
2. Were all sample holding times met?	✓			
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			
C. QC Samples				
1. Is the blank yield within acceptance criteria?	✓			
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			✓	
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			
7. Is the LCS yield within acceptance criteria?	✓			
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			
9. MS/MSD results and yield meet acceptance criteria?			✓	
10. Duplicate sample results and yield meet acceptance criteria?	✓			
D. Other				
1. Are all Nonconformances included and noted?	✓			
2. Are all required forms filed out?	✓			
3. Correct methodology used?	✓			PK
4. Transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Units checked?	✓			

Comments on any "No" response: Per NCM PK 3-22-99

First Level Review: Pam Kowitz

Date: 3-21-99

Second Level Review: _____

Date: _____

Form #: LS-038.2 /96, Rev. 4

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

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LOG #: RD-99-_____

Project ID: <u>BHI</u>	NCM Initiated by: <u>PKanig 23-899</u>
Sample Numbers: <u>J98250157</u>	
Tests: <u>Uiso</u>	
Matrix: <u>solid</u>	

Analytical Area (check appropriate area):

- | | | | |
|--|--------------------------------|--|--|
| <input type="checkbox"/> Sample control | <input type="checkbox"/> GC | <input type="checkbox"/> Wet chemistry | <input type="checkbox"/> Data review |
| <input type="checkbox"/> Organic preparation | <input type="checkbox"/> HPLC | <input type="checkbox"/> Metals | <input checked="" type="checkbox"/> Radiochemistry |
| <input type="checkbox"/> Inorganic preparation | <input type="checkbox"/> GC/MS | <input type="checkbox"/> Reporting | <input type="checkbox"/> Bioassay |

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

- ☐ 1. Holding time expired in transit
- ☐ 2. Sample received > 48 hrs. or 1/2 holding time has expired
- ☐ 3. Test added by client after expiration

Category II: Laboratory Dependent

- ☐ 4. Instrument failure
- ☐ 5. Analyst error
- ☐ 6. Login error
- ☐ 7. Miscommunication
- ☐ 8. Other (complete description required)

Category III: Analysis Reruns (QA/QC)

- ☐ 9. Surrogates
- ☐ 10. Internal Standards
- ☐ 11. Spike Recoveries
- ☐ 12. Blank Contamination

Category IV: Analysis Reruns (Confirmation)

- ☐ 13. Second column
- ☐ 14. Contamination check
- ☐ 15. Confirmation of matrix effects
- ☐ 16. Other (complete description required)

Quality Assurance/Quality Control

- ☐ 17. QC data reported outside of controls
- ☐ 18. Incorrect procedure used
- ☐ 19. SOP intentionally modified with QA and Tech. approval
- ☐ 20. Invalid instrument calibration
- ☐ 21. Insufficient sample received for proper analysis

Incorrect or Incomplete Client Deliverable

- ☐ 22. Hardcopy deliverable error
- ☐ 23. Electronic deliverable error

Reported detection limits elevated due to:

- ☐ 24. Sample matrix
- ☐ 25. Insufficient sample volume
- ☐ 26. Other (complete description required)

☒ 27. Other (specify): possible contamination

Comments/Explanation: _____

Notification (check appropriate area):

Client notified by (name and date): _____

- ☒ in writing CW
- ☐ by facsimile
- ☐ by telephone
- ☐ other (explain)

Client's name and response: _____

- ☐ process "as is"
- ☐ re-sample
- ☐ on hold until _____
- ☐ other (explain)

Project Manager (signature and date):

[Signature] 4/8/99

0027A

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 2 OF 2

LOG#: RD-99-_____

Corrective Action

Root Cause

Initial and date: For 3/9/99

Before column sample centrifuged - Small amt of material from outside of cent. tube fell into spike

Corrective Action

Initial and Date: PK 3-22-99

Reanalysis was started before data finished going thru system. Reanalysis data accepted

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence

Initial and Date: _____

First Level Supervisor: Ram K. Smithee

Date: 4-8-99

Responsible Manager: D. Smithee

FOR VHP

Date: 4/8/99

Quality Assurance Review

☐ Anomaly

☐ Deficiency

☒ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: [Signature]

Date: 4-7-99

Corrective Action Verification

☒ Verified

☐ Cannot Verify (specify reason): N/A

Nonconformance Memo Closure

QA signature/date: [Signature]

00273

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s):	9B250157			
Client ID:	BNT			
Due Date:	3/12/99			
Lab Sample Number or SDG:	9059109			
Method Test Parameters:	Gamma			
Matrix:	Soil			
	Review Item	Yes (✓)	No (✓)	N/A (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?				✓
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?				✓
2. Were all sample holding times met?				✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples				
1. Is the blank yield within acceptance criteria?				✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?				✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?				✓
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria?				✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. MS/MSD results and yield meet acceptance criteria?				✓
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. Other				
1. Are all Nonconformances included and noted?				✓
2. Are all required forms filed out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked?	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓
Comments on any "No" response:				

First Level Review: Regine Waidele Date: 3/15/99

Second Level Review: [Signature] Date: 2/8/99

Form #: LS-Q38.2/96, Rev. 4

Transfer CS137, low, EU152, EU154,
EU155, Razzu, Razzu, Amx41, U238

**Quanterra Data Review Checklist
RADIOCHEMISTRY**

Work Order number (s): <u>J9B250157</u>				
Client ID: <u>BH2</u>				
Due Date: <u>3-12-99</u>				
Lab Sample Number or SDG: <u>902911D</u>				
Method Test Parameters: <u>TOTAL Sr</u>				
Matrix: <u>SOIL</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			✓
2. Were all sample holding times met?	✓			✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples				
1. Is the blank yield within acceptance criteria?	✓			✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			✓	
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria?	✓			✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. MS/MSD results and yield meet acceptance criteria?			✓	
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. Other				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filed out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked? <u>SM 3-11-99</u>	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response: _____

First Level Review: _____

Second Level Review: _____

Form #: LS-038.2/96, Rev. 4

Date: 3/14/99

Date: 4/18/99

0029

**Quanterra Data Review Checklist
RADIOCHEMISTRY**

Work Order number (s): <u>598250157</u>				
Client ID: <u>BNT</u>				
Due Date: <u>3/12/99</u>				
Lab Sample Number or SDG: <u>9059105</u>				
Method Test Parameters: <u>Nickel-63</u>				
Matrix: <u>Soil</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓		JW 3/22/99	✓
2. Were all sample holding times met?			✓	
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples				
1. Is the blank yield within acceptance criteria?	✓		JW 3/22/99	✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			✓	
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria?	✓			✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. MS/MSD results and yield meet acceptance criteria?	✓			✓
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. Other				
1. Are all Nonconformances included and noted? <u>(1-NCM)</u>	✓			✓
2. Are all required forms filed out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked? <u>JW 3/20/99</u>	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response: ID switch hft dup & RLS - see NCM data accepted (only sample in batch)

First Level Review: [Signature]
 Second Level Review: [Signature]
 Form #: LS-038.2/96, Rev. 4

Date: 3/22/99
 Date: 4/5/99

[Signature] 3/22/99

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

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LOG #: RD-99- 102

Project ID: <u>J9B250157 BHI</u>	NCM Initiated by: <u>8/23/22/99</u>
Sample Numbers: <u>CR4FH10PS, CR4FH109X</u>	
Tests: <u>N163</u>	
Matrix: <u>Soil</u>	

Analytical Area (check appropriate area):

- | | | | |
|--|--------------------------------|--|--|
| <input type="checkbox"/> Sample control | <input type="checkbox"/> GC | <input type="checkbox"/> Wet chemistry | <input checked="" type="checkbox"/> Data review |
| <input type="checkbox"/> Organic preparation | <input type="checkbox"/> HPLC | <input type="checkbox"/> Metals | <input checked="" type="checkbox"/> Radiochemistry |
| <input type="checkbox"/> Inorganic preparation | <input type="checkbox"/> GC/MS | <input type="checkbox"/> Reporting | <input type="checkbox"/> Bioassay |

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

- ☐ 1. Holding time expired in transit
- ☐ 2. Sample received > 48 hrs. or 1/2 holding time has expired
- ☐ 3. Test added by client after expiration

Category II: Laboratory Dependent

- ☐ 4. Instrument failure
- ☐ 5. Analyst error
- ☐ 6. Login error
- ☐ 7. Miscommunication
- ☐ 8. Other (complete description required)

Category III: Analysis Reruns (QA/QC)

- ☐ 9. Surrogates
- ☐ 10. Internal Standards
- ☐ 11. Spike Recoveries
- ☐ 12. Blank Contamination

Category IV: Analysis Reruns (Confirmation)

- ☐ 13. Second column
- ☐ 14. Contamination check
- ☐ 15. Confirmation of matrix effects
- ☐ 16. Other (complete description required)

Quality Assurance/Quality Control

- ☐ 17. QC data reported outside of controls
- ☐ 18. Incorrect procedure used
- ☐ 19. SOP intentionally modified with QA and Tech. approval
- ☐ 20. Invalid instrument calibration
- ☐ 21. Insufficient sample received for proper analysis

Incorrect or Incomplete Client Deliverable

- ☐ 22. Hardcopy deliverable error
- ☐ 23. Electronic deliverable error

Reported detection limits elevated due to:

- ☐ 24. Sample matrix
- ☐ 25. Insufficient sample volume
- ☐ 26. Other (complete description required)

☒ 27. Other (specify): ID Switch with duplicate and matrix spike samples

Comments/Explanation: _____

Notification (check appropriate area):

Client notified by (name and date): _____

- ☒ in writing CN
- ☐ by facsimile
- ☐ by telephone
- ☐ other (explain)

Client's name and response: _____

- ☐ process "as is"
- ☐ re-sample
- ☐ on hold until
- ☐ other (explain)

Project Manager (signature and date): [Signature] 4/6/99

00.30A

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 2 OF 2

LOG#: RD-99-

102

Corrective Action

Root Cause

Tech error

Initial and date: JVB/20/99

Corrective Action

Initial and Date: JVB/20/99

Since only one sample w/dup IDs in batch - labelling error is obvious. Dups agree and NIS is within limits, therefore IDs were corrected and results recalculated.
Data accepted.

Responsibility for performing CA assigned to:

Actions to prevent recurrence

Initial and Date: JVB/20/99

Tech reminded to use caution: Check sample IDs when labelling vials.

First Level Supervisor:

Jacqueline Waddell

Date: 3/20/99

Responsible Manager:

R. Swann For VHP

Date: 4/8/99

Quality Assurance Review

☐ Anomaly

☒ Deficiency

☐ Rerun

☐ Further action required:

Assigned to:

QA signature:

R. Swann

Date:

4-8-99

Corrective Action Verification

☒ Verified

☐ Cannot Verify (specify reason):

N/A

Nonconformance Memo Closure

QA signature/date:

R. Swann 4-8-99

0030B



Richland Laboratory
Data Review Check List
METALS

<u>Work Order Number(s):</u> QC Batch 9070195 (Reextraction of 9069321)				
<u>Lab Sample Numbers or SDG:</u> W02690				
<u>Method/Test/Parameter:</u> CR+6 in SCIL				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Initial Calibration				
1. Performed at required frequency with required number of levels?	✓			✓
2. Correlation coefficient within QC limits?	✓			✓
3. Initial calibration verification (ICV) analyzed immediately after calibration and results within QC limits?	✓			✓
4. Initial calibration blank(ICB) analyzed immediately after ICV and concentrations of all parameters \leq reporting limit?	✓			✓
B. Continuing Calibration				
1. CCV analyzed at required frequency and all parameters within QC limits?	✓			✓
2. CCB analyzed at required frequency and all results \leq reporting limit?	✓			✓
C. Sample Analysis				
1. Were any samples with concentrations above the linear range for any parameter diluted and reanalyzed?	✓			✓
2. Were all sample holding times met?	✓			✓
D. QC Samples				
1. All results for the preparation blank below limits?	✓			✓
2. MS or MS/MSD recoveries within QC limits and %RPD (for MSD) acceptable?	✓			✓
3. LCS percent recovery within QC limits and %RPD (for LCSD) acceptable?	✓			✓
4. Analytical spikes within QC limits where applicable?			✓	
5. ICP only: One serial dilution performed per SDG?			✓	
6. ICP only: CRDL standard (CRI or CRA) analyzed at required frequency?			✓	
7. ICP only: Interference check samples (ICSA, ICSAB) and HICAL analyzed at the required frequencies and within QC limits?			✓	

CHAIN OF CUSTODY FORMS

Q-27034

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST						B99-002-72		Page 1 of 1							
Collector Fahlberg/Coffman		Company Contact R Coffman		Telephone No. 376-6425		Project Coordinator TRENT, SJ		Price Code		Data Turnaround 15 Days							
Project Designation 100 BC Areas - Full Protocol		Sampling Location 100B/C		SAF No. B99-002													
Ice Chest No. ERC 99-009		Field Logbook No. EL 1327-2		Method of Shipment GOV. VEHICLE, HAND DELIVERED													
Shipped To Quanterra Incorporated		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A													
				COA R16B112600													
POSSIBLE SAMPLE HAZARDS/REMARKS				Preservation		Cool 4C	None	None	None								
				Type of Container		aG	P	aG	Marinelli								
				No. of Container(s)		0	1	1	1								
Special Handling and/or Storage				Volume		60mL	20mL	250mL	500mL								
SDG W02690 SAMPLE ANALYSIS J9B250157				Chromium Hex - 7196		Activity Scan	ICP Metals - 6010A (SW-846) (Chromium, Lead), Mercury - 7471 - (CV)	See item (1) in Special Instructions									
Sample No.		Matrix *		Sample Date		Sample Time											
B0TXP2 CR4FH		Soil		2.24.99		0950		X	X	X	X						
CHAIN OF POSSESSION		Sign/Print Names						SPECIAL INSTRUCTIONS				Matrix *					
Relinquished By R. Felle		Date/Time 1672		Received By R. Fahlberg		Date/Time 2.24.99		If Hex Chrome analyses is done in Richland, take needed volume from the 500 mL Marinelli; if done in St Louis, take needed volume from the 250 mL aG ICP bottle.				Soil Water Vapor Other Solid Other Liquid					
Relinquished By R. NELSON		Date/Time 2.25.99		Received By Dawn S. Hinkley		Date/Time 2.25.99		(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241, Uranium-238}; Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 -- Total Sr; Nickel-63									
Relinquished By S. GALE		Date/Time 2-25-99		Received By		Date/Time											
Relinquished By		Date/Time		Received By		Date/Time											
Relinquished By		Date/Time		Received By		Date/Time		Stored in Refrigerator 1C									
LABORATORY SECTION		Received By		Title						Date/Time							
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time									

6034

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.

Radiological Counting Facility THI - RCF

138-02

Project	100BC	Location 116-B-1
Customer ID	B0TFT8	
RCF ID	RCF5443	
Isotope	Sample time, date	9:08 date
	Activity, pCi/gm on date	2/8/99
K40	1.6e+01 +/-	1.7e+00
Co60	2.0e-02 +/-	2.0e-02
I129	< 6.1e-01	
Cs137	9.5e-02 +/-	3.0e-02
Eu152	< 1.5e-01	
Eu154	1.5e-01 +/-	7.0e-02
Eu155	< 1.1e-01	
Th232dau	1.9e+00 +/-	4.5e-01
U235	< 2.9e-01	
U238	3.1e+00 +/-	2.9e+00
U238dau	9.0e-01 +/-	1.5e-01
Np237	< 7.2e-02	
Am241	< 7.5e-02	
Total Activity (pCi/gm)		2.2e+01

Sr-90 N/R
 Gross Alpha N/R
 Gross Beta N/R
 AEA N/R

Definitions:

All errors reported at 2 standard deviations

For soils and natural samples, the following applies:

The analysis of U238 is based on the activity of Pa234m

The analysis of Np237 is based on the activity of Pa233

U238dau is the activity of Pb214 and Bi214, short lived daughter products
 of U238. Equilibrium between parent and daughter products probably
 does not exist in disturbed materials.

Th232dau is the activity of Ac228, Pb212, and Tl208, short lived daughter products
 of Th232. Equilibrium between parent and daughter products may
 not exist in disturbed materials.

Other samples, not containing natural materials, may have inapplicable results
 for the Th, U, transuranics and daughter products.

N/R means no result or analysis not requested.

Kathryn A. Robertson-DeMers
 2/11/99

K.A. Robertson-DeMers Date
 ERC Radiological Counting Facility

0035

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 2-25-99 955 SG#: W02690

Work Order Number: 9AB250157 SAF #: B99-002

Shipping Container ID: ERK 16-100 Chain of Custody # B99-002-72

1. Custody Seals on shipping container intact? Yes ☒ No ☐

2. Custody Seals dated and signed? Yes ☒ No ☐

3. Chain-of-Custody record present? Yes Yes ☒ No ☐

4. Cooler temperature _____

5. Vermiculite/packing materials is Wet ☐ Dry ☒

6. Number of samples in shipping container: 15

7. Sample holding times exceeded? Yes ☐ No ☒

8. ~~Samples~~ have:

 tape

hazard labels

~~_____~~ custody seals

 appropriate sample labels

9. Samples are:

 in good condition

_____ leaking

broken

have air bubbles

10. Where any anomalies identified in sample receipt? Yes ☐ No ☒

11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: A. H. H. H. Date: 2-25-79

Telephoned To: _____ On 1/1 By _____

Client Sample Screening Results

25-Feb-99

83 2/25/99

CLIENT CODE	ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B	
BH	BOTXP2		2/25/99 12:23:00 PM	QUAD21A	2/25/99 3:23:03 PM	BOTXP2	30	10	0.23333333	98	2.24333333	
	CR4FH	SOIL		Bkg:	2/25/99 3:55:09 AM	BKG	600	36	0.06	614	1.02333333	
Anal Date: 2/25/99		Tot Sa, Alq: 8.10E+02		, 8.22E+01	Alp; (Dpm/ 1.60E+00		(uCi/ 7.08E-06	(pCi/ 8.74E+00	+ 6.3E+00	CAT	5.7E+00	Lab
Ppt mg: 82.2		Units: mg		, mg	Bet; Alq: 4.96E+00		Sa: 2.20E-05	L/g: 2.72E+01	+ 4.1E+00	✓	3.7E+00	Alq L/g

0037

25-Feb-99

COC Signature Page

W02690
Batch #: 9059108

	Initials/Date	Procedure #
Released By	<u>SK 3-1-99</u>	<u>RichRC00009</u>
Received	<u>CE 3/1/99</u>	<u>RC5013</u>
Released By	<u>CE 3/3/99</u>	<u>n/a</u>
Received	<u>SK 3-4-99</u>	<u>RC 5019</u>
Released By	<u>SK 3-8-99</u>	<u>n/a</u>
Received	<u>SK 3-10-99</u>	<u>RichRC5080-0</u>
Released By	<u>SK 3-13-99</u>	<u>n/a</u>
Received	<u>CO 3-15-99</u> ^{CPTN 3-15-99}	<u>RichRC5003</u>
Released By	<u>WL 3-15-99</u>	<u>n/a</u>
Received	<u>SK 3-15-99</u>	<u>RichRC5003</u>
Released By	<u>SK 3-16-99</u>	<u>n/a</u>
Received	<u>DM 3-17-99</u>	<u>RichRC5003</u>
Released By	<u>DM 3-17-99</u>	<u>n/a</u>
Received	<u>PK 3-17-99</u> <u>PK 3-17-99</u>	<u>RichRC0002</u>

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RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEETRun Date: 2/28/99
Time: 9:49:17

Prep	Sep1	Sep2
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Samples Covered
Labware Labeled
Verify Test/Container
Samples Ordered Sequentially
Logbooks Entered

*
* QC BATCH: 9059108 *
*

Prep Dt/Tm/Person:	2/28/99	0
Sep1 Dt/Tm/Person:	0/00/00	00000
Sep2 Dt/Tm/Person:	0/00/00	00000
Cocktail Date/Time:	0/00/00	

SX: Americium-241 by Alpha Spec
6I: PuAm PrpRC5013/RC5019, SepRC5080(5003)/RC5010(5039)
5I: RCH: HANFORD ANALYTICAL

ANL DUE	LOT#,MSRUN#/ WORK ORDER	CLIENT MATRIX	INIT/ FINAL	DISH	GEOM	PPT1WT	pH	COUNT TIME	MID/AVE DATE/TIME	TRACER ID/ SPIKE ID	CRDL	UNITS
3/12/99	J9B250157-001 CR4FH-1-0DX	SOLID		JCR4FH1R								pCi/g
3/12/99	J9B250157-001 CR4FH-1-07	SOLID										pCi/g
0/00/00	J9B280000-108 CR7AE-1-01B	SOLID		JCR7AE1B								pCi/g
0/00/00	J9B280000-108 CR7AE-1-02C	SOLID		JCR7AE1S								pCi/g

NUMBER OF WORK ORDERS IN BATCH:

4

0039

COC Signature Page

W02690
Batch #: 9059106

	Initials/Date	Procedure #
Released By	AK 3-1-99	Rele 0009
Received	CL 3/1/99	RC5013
Released By	CL 3/3/99	n/a
Received	SK 3-1-99	RC5019
Released By	3/1 3-8-99	n/a
Received	dl 3-10-99	RICHRC 5010-0 RICHRC 5080-0
Released By	dl 3-12-99	n/a
Received	Col 3-12-99 Ed ol 3-15-99	RICHRC 5039.1
Released By	W 3-15-99	n/a
Received	r 3/15/99	RICHRC 5000
Released By	r 3/16/99	n/a
Received	DM 3-18-99	RICHRC 5003
Released By	DM 3-18-99	n/a
Received	PK 3-18-99	RICHRC 0002
	PM 3-18-99	RICHRC 0002

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RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEETRun Date: 2/28/99
Time: 9:47:16

Prep	Sep1	Sep2	
---	---	---	Samples Covered
---	---	---	Labware Labeled
---	---	---	Verify Test/Container
---	---	---	Samples Ordered Sequentially
---	---	---	Logbooks Entered

*
* QC BATCH: 9059106 *
*

Prep Dt/Tm/Person:	2/28/99	0
Sep1 Dt/Tm/Person:	0/00/00	00000
Sep2 Dt/Tm/Person:	0/00/00	00000
Cocktail Date/Time:	0/00/00	

SO: Plutonium-238,239/40 by Alpha Spec
6I: PuAm PrpRC5013/RC5019; SepRC5080 (5003)/RC5010 (5039)
5I: RCH: HANFORD ANALYTICAL

ANL DUE	LOT#,MSRUN#/ WORK ORDER	CLIENT MATRIX	INIT/ FINAL	DISH	GEOM	PPT1WT	pH	COUNT TIME	MID/AVE DATE/TIME	TRACER ID/ SPIKE ID	CRDL	UNITS
3/12/99	J9B250157-001 CR4FH-1-0AX	SOLID		JCR4FH1R							1	pCi/g
3/12/99	J9B250157-001 CR4FH-1-06	SOLID									1	pCi/g
0/00/00	J9B280000-106 CR7AC-1-01B	SOLID		JCR7AC1B							1	pCi/g
0/00/00	J9B280000-106 CR7AC-1-02C	SOLID		JCR7AC1S							1	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 4

0041

COC Signature Page

Batch #:	BHI Initials/Date	Procedure #
9068182	uiso	
Released By		
Received	SK 3-9-99	RC 5019
Released By	SL 3-12-99	n/a
Received	PL 3-12-99	RC 5079
Released By	PL 3-15-99	n/a
Received	PL 3-15-99	EXTRACTED 3-16-99 RICHARD 30
Released By	PL 3-12-99	Ed. 3-18-99 RICHARD 39.1 n/a
Received	PL 3-18-99	RICHARD 30
Released By	PL 3-20-99	n/a
Received	PL 3-21-99	RICHARD 30
Released By	PL 3-21-99	n/a
Received	PL 3-21-99	RICHARD 30
Released By	PL 3-22-99	n/a
Received		

RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEETRun Date: 3/09/99
Time: 10:43:41

Prep	Sep1	Sep2
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Samples Covered
Labware Labeled
Verify Test/Container
Samples Ordered Sequentially
Logbooks Entered

*
* QC BATCH: 9068182 *
*

Prep Dt/Tm/Person:	3/09/99	0
Sep1 Dt/Tm/Person:	0/00/00	000000
Sep2 Dt/Tm/Person:	0/00/00	000000
Cocktail Date/Time:	0/00/00	

SR: Uranium-234,235,238 by Alpha Spec
7S: UIso PrpRC5013/RC5019, SepRC5079(5039)
5I: RCH: HANFORD ANALYTICAL

ANL DUE	LOT#,MSRUN#/ WORK ORDER	CLIENT MATRIX	INIT/ FINAL	DISH	GEOM	PPT1WT	pH	COUNT TIME	MID/AVE DATE/TIME	TRACER ID/ SPIKE ID	CRDL	UNITS
0/00/00	J9C090000-182 CRFED-1-01B	SOLID		JCRFED1B							1	pCi/g
0/00/00	J9C090000-182 CRFED-1-02C	SOLID		JCRFED1S							1	pCi/g
3/12/99	J9B250157-001 CR4FH-1-0GX	SOLID		JCR4FH2R							1	pCi/g
3/12/99	J9B250157-001 CR4FH-2-03	SOLID									1	pCi/g

NUMBER OF WORK ORDERS IN BATCH:

4

0043

DUE DATE 3-12-99

***** RE-EXTRACTION REQUEST *****
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

CUSTOMER BHT

ANALYSIS Uiso

MATRIX soil

SAMPLE DELIVERY GROUP 402690

OLD BATCH NUMBER 9059107

NEW BATCH NUMBER 9068182

LAB SAMPLE ID	CUSTOMER ID	COMMENTS
1) CR4EH		2g
2) CR4EH sup		g
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		
11)		
12)		
13)		
14)		
15)		
16)		
17)		
18)		
19)		
20)		

LAB QC ID		
BLANK)		
SPIKE)		

COC Signature Page

W02690

Batch #:	Initials/Date	Procedure #
9059109		
Released By	<u>AD 3/1/99</u>	<u>Rich10009</u>
Received	<u>CL 3/1/99</u>	<u>RC5013/5017</u>
Released By	<u>CL 3/3/99</u>	<u>n/a</u>
Received	<u>CL 3/3/99</u>	<u>RICHRC0007 Rev1</u>
Released By		<u>n/a</u>
Received	<u>CL 3/15/99</u>	<u>RICH155226</u>
Released By	<u>CL 3/15/99</u>	<u>n/a</u>
Received	<u>JW 3/15/99</u>	<u>RICHRC00002/2</u>
Released By	<u>JW 3/15/99</u>	<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		

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RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEETRun Date: 2/28/99
Time: 9:50:16

Prep Sep1 Sep2

_____	_____	_____	Samples Covered
_____	_____	_____	Labware Labeled
_____	_____	_____	Verify Test/Container
_____	_____	_____	Samples Ordered Sequentially
_____	_____	_____	Logbooks Entered

*
* QC BATCH: 9059109 *
*

Prep Dt/Tm/Person:	2/28/99	0
Sep1 Dt/Tm/Person:	0/00/00	000000
Sep2 Dt/Tm/Person:	0/00/00	000000
Cocktail Date/Time:	0/00/00	

TA: Gamma by HPGE
AW: Gamma PrpRC5017
5I: RCH: HANFORD ANALYTICAL

ANL DUE	LOT#,MSRUN#/ WORK ORDER	CLIENT MATRIX	INIT/ FINAL	DISH	GEOM	PPT1WT	pH	COUNT TIME	MID/AVE DATE/TIME	TRACER ID/ SPIKE ID	CRDL	UNITS
3/12/99	J9B250157-001 CR4FH-1-0EX	SOLID		JCR4FH1R							--	pCi/g
3/12/99	J9B250157-001 CR4FH-1-02	SOLID									--	pCi/g
0/00/00	J9B280000-109 CR7AF-1-01B	SOLID		JCR7AF1B							--	pCi/g
0/00/00	J9B280000-109 CR7AF-1-02C	SOLID		JCR7AF1S							--	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 4

0046

COC Signature Page

W02690

Batch #:	9059110	Initials/Date	Procedure #
Released By	<u>XDL 3-1-99</u>	<u>RICKKLU009</u>	
Received	<u>CL 3/1/99</u>	<u>RC5013</u>	
Released By	<u>CL 3/3/99</u>	n/a	
Received	<u>DR 3-3-99</u>	<u>RC50130</u>	
Released By	<u>DR 3-8-99</u>	n/a	
Received	<u>RTM 3/8/99</u>	<u>RICHRC5006/2</u>	
Released By	<u>RTM 3/9/99</u>	n/a	
Received	<u>DR 3/9/99</u>	<u>RICHRC0003FEV2</u>	
Released By	<u>ml 3/10/99</u>	n/a	
Received	<u>Jm 3-11-99</u>	<u>RICH255001</u>	
Released By	<u>Jm 3-11-99</u>	n/a	
Received	<u>JW 3/12/99</u>	<u>RICHRC0003b</u>	
Released By	<u>JW 3/14/99</u>	n/a	
Received			

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RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEETRun Date: 2/28/99
Time: 9:51:26

Prep	Sep1	Sep2	
_____	_____	_____	Samples Covered
_____	_____	_____	Labware Labeled
_____	_____	_____	Verify Test/Container
_____	_____	_____	Samples Ordered Sequentially
_____	_____	_____	Logbooks Entered

*
* QC BATCH: 9059110 *
*

Prep Dt/Tm/Person:	2/28/99	0
Sep1 Dt/Tm/Person:	0/00/00	000000
Sep2 Dt/Tm/Person:	0/00/00	000000
Cocktail Date/Time:	0/00/00	

TH: Total Strontium by GPC
CH: Sr-Total PrpRC5013, SepRC5006
SI: RCH: HANFORD ANALYTICAL

ANL DUE	LOT#,MSRUN#/ WORK ORDER	CLIENT MATRIX	INIT/ FINAL	DISH	GEOM	PPT1WT	pH	COUNT TIME	MID/AVE DATE/TIME	TRACER ID/ SPIKE ID	CRDL	UNITS
3/12/99	J9B250157-001 CR4FH-1-0FX	SOLID		JCR4FH1R							1	pCi/g
3/12/99	J9B250157-001 CR4FH-1-04	SOLID									1	pCi/g
0/00/00	J9B280000-110 CR7AG-1-01B	SOLID		JCR7AG1B							1	pCi/g
0/00/00	J9B280000-110 CR7AG-1-02C	SOLID		JCR7AG1S							1	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 4

0048

COC Signature Page

W02690

Batch #: 9059105

	Initials/Date	Procedure #
Released By	<u>XXX 3-1-99</u>	<u>RichRC0009</u>
Received	<u>CZ RC 3/1/99</u>	<u>RC5013</u>
Released By	<u>CZ 3/3/99</u>	<u>n/a</u>
Received	<u>SK 3-4-99</u>	<u>RC 5019</u>
Released By	<u>SK 3-8-99</u>	<u>n/a</u>
Received	<u>RB 3/8/99</u>	<u>RichRC5069</u>
Released By	<u>RTM 3/15/99</u>	<u>n/a</u>
Received	<u>3/15/99</u>	<u>RichRC0001</u>
Released By	<u>RC 3/19/99 RC 3/19/99</u>	<u>n/a</u>
Received	<u>RC 3/20/99 RC 3/19/99</u>	<u>N/A</u>
Released By	<u>RC 3/20/99</u>	<u>n/a</u>
Received	<u>JW 3/20/99</u>	<u>RichRC0002/2</u>
Released By	<u>JW 3/22/99</u>	<u>n/a</u>
Received		

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RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEETRun Date: 3/11/99
Time: 16:40:10

Prep	Sep1	Sep2	
_____	_____	_____	Samples Covered
_____	_____	_____	Labware Labeled
_____	_____	_____	Verify Test/Container
_____	_____	_____	Samples Ordered Sequentially
_____	_____	_____	Logbooks Entered

* QC BATCH: 9059105 *

Prep Dt/Tm/Person:	2/28/99	0
Sep1 Dt/Tm/Person:	0/00/00	000000
Sep2 Dt/Tm/Person:	0/00/00	000000
Cocktail Date/Time:	0/00/00	

S4: Nickel by ICP and Nickel-63 by Liquid Scint
AF: Ni-63 PrpRC5013/5019, SepRC5069
SI: RCH: HANFORD ANALYTICAL

ANL DUE	LOT#,MSRUN#/ WORK ORDER	CLIENT MATRIX	INIT/ FINAL	DISH	GEOM	PPT1WT	pH	COUNT TIME	MID/AVE DATE/TIME	TRACER ID/ SPIKE ID	CRDL	UNITS
3/12/99	J9B250157-001 CR4FH-1-0PS	9070097 SOLID		JCR4FH1W							30	pCi/g
3/12/99	J9B250157-001 CR4FH-1-05	9070097 SOLID									30	pCi/g
3/12/99	J9B250157-001 CR4FH-1-09X	9070097 SOLID		JCR4FH1R							30	pCi/g
0/00/00	J9B280000-105 CR7AA-1-01B	SOLID		JCR7AA1B							30	pCi/g
0/00/00	J9B280000-105 CR7AA-1-02C	SOLID		JCR7AA1S							30	pCi/g
0/00/00	J9B280000-105 CR7AA-1-03B N	SOLID		JCR7AA1N							30	pCi/g

NUMBER OF WORK ORDERS IN BATCH:

6

0050

COC Signature Page

Batch #:	Initials/Date	Procedure #
9069321 9070195 (retraction)		
Released By	<u>RR 3/10/99</u>	<u>RichRC0009</u>
Received	<u>(R) 3/10/99</u>	<u>RICHWC5005 R43 (R) 3/10/99</u>
Released By	<u>(R) 3/11/99</u>	n/a
Received		
Released By		n/a
Received		
Released By		n/a
Received		
Released By		n/a
Received		
Released By		n/a
Received		
Released By		n/a
Received		

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

CASE NARRATIVE

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, Washington 99352

March 27, 1999

Attention: Joan Kessner

Project Number	:	550.184
SDG	:	W02690
Number of Samples	:	One (1)
Sample Matrix	:	Soil
Data Deliverable	:	IV/EB
Date SDG Closed	:	February 25, 1999

II. Introduction

On February 25, 1999, one (1) "soil" sample was received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. St. Louis received 1-120ml bottle, not the 250 ml bottle listed on the COC. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID's:

<u>St. Louis ID</u>	<u>BHI ID</u>	<u>SAF ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
20790-001	B0TXP2	B99-002	SOIL	25-FEB-99

III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits.

Analyses requested: ICP Metals 6010 (SW 846){Chromium, Lead}
Mercury - 7471 - (CV)

Deviation from Request: No Deviation from requested methods.

000002

Bechtel Hanford Incorporated
March 27, 1999
Project Number: 550.184
SDG: W02690
Page 2

IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK - Quality Control Blank, Method Blank
QCLCS - Quality Control Laboratory Control Sample, Blank Spike
MS - Matrix Spike
MSD - Matrix Spike Duplicate

V. Comments

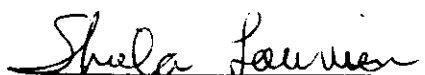
General: Priority results were transmitted via facsimile on March 12, 1999.

Metals: A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

The Matrix Spike and Matrix Spike duplicate for Mercury had recoveries slightly above the 125% recovery limit. The MS was recovered at 129% and the MSD was at 129%, therefore, all associated data was flagged with a "N". The LCS recovery was within QC limits, indicating that the analysis was in control.

I certify that this Summary Package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:



Shiela M. Louvier
St. Louis Project Manager

000003

W02690

Quanterra February 26, 1999 05:11 pm
 Account: 10722 Project: 550.184 Quanterra-Richland QAS No. 550.184 Rev. 3
 Master Sample Login: 20790

Project Manager: S. Louvier

Reviewed by and Date: Shiela Louvier 2-26-99

Sample Header Template:

Sample No.	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
#	Comments	Analysis	Class	Preservative	Anal. Due Date	Hold Date Site	(Container Numbers: % Filled)	
20790-001	B0TXP2	Soil	24-FEB-99 09:50	25-FEB-99 09:55	11-MAR-99	AIRBORNE	1	Screening not Required
	SAF B99-002/ICAP = CR, PB.							
1	AN - Amber Glass-120ML	HG/7471/Q4	S	COLD	09-MAR-99	24-MAR-99 R7A		(431283:99)
1		ICAP/6010/Q4	S	COLD	09-MAR-99	23-AUG-99 R7A		(431283:99)
1		PM/IT/Q4	S	COLD	09-MAR-99	23-AUG-99 R7A		(431283:99)
20790-001MS	B0TXP2	Soil	24-FEB-99 09:50	25-FEB-99 09:55	11-MAR-99	AIRBORNE	1	Screening not Required
	SAF B99-002/ICAP = CR, PB.							
1	AN - Amber Glass-120ML	HG/7471/Q4	S	COLD	09-MAR-99	24-MAR-99 R7A		(431283:99)
1		ICAP/6010/Q4	S	COLD	09-MAR-99	23-AUG-99 R7A		(431283:99)
20790-001MSD	B0TXP2	Soil	24-FEB-99 09:50	25-FEB-99 09:55	11-MAR-99	AIRBORNE	1	Screening not Required
	SAF B99-002/ICAP = CR, PB.							
1	AN - Amber Glass-120ML	HG/7471/Q4	S	COLD	09-MAR-99	24-MAR-99 R7A		(431283:99)
1		ICAP/6010/Q4	S	COLD	09-MAR-99	23-AUG-99 R7A		(431283:99)

3*-Sample has not been rad screened.

F00000

60



5157747-770

Co

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Q - 27034

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-002-72		Page 1 of 1					
Collector Fahlberg/Coffman		Company Contact R Coffman		Telephone No. 376-6425		Project Coordinator TRENT, SJ		Price Code Data Turnaround 15 Days					
Project Designation 100 BC Areas - Full Protocol		Sampling Location 100B/C		SAF No. B99-002									
Ice Chest No. ERC 99-009		Field Logbook No. EL 1327-2		Method of Shipment GOV. VEHICLE, HAND DELIVERED									
Shipped To Quanterra Incorporated		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A									
				COA R16B112600									
POSSIBLE SAMPLE HAZARDS/REMARKS		Preservation	Cool 4C	None	None	None							
		Type of Container	aG	P	aG	Marinelli							
		No. of Container(s)	0	1	1	1							
		Volume	60mL	20mL	250mL	500mL							
Special Handling and/or Storage													
SDG W02690		SAMPLE ANALYSIS J9B250157		Chromium Hex - 7196	Activity Scan	ICP Metals - 6010A (SW- 846) (Chromium, Lead), Mercury - 7471 - (CV)	See item (1) in Special Instructions						
Sample No.	Matrix *	Sample Date	Sample Time										
BOTXP2 CR4FH	Soil	2.24.99	0950	X	X	X	X						
CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *			
Relinquished By R. F. COO		Date/Time 1672		Received By R. F. COO		Date/Time 1673		If Hex Chrome analyses is done in Richland, take needed volume from the 500 mL Marinelli; if done in St Louis, take needed volume from the 250 mL aG ICP bottle. (1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241, Uranium-238}; Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 -- Total Sr; Nickel-63 Stored in Refrigerator 1C				Soil Water Vapor Other Solid Other Liquid	
Relinquished By R. WILSON		Date/Time 2-23-99		Received By R. WILSON		Date/Time 2-23-99							
Relinquished By Airborne		Date/Time 2-23-99		Received By Airborne		Date/Time 2-23-99							
Relinquished By		Date/Time		Received By		Date/Time							
LABORATORY SECTION		Received By				Title				Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method				Disposed By				Date/Time			

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.

Radiological Counting Facility TH1 - RCF

138-02

Project 100BC Location 116-B-1
Customer ID B0TFT8
RCF ID RCF5443
Sample time, date 9:08 date
Isotope Activity, pCi/gm on date 2/8/99

K40		1.6e+01 +/-	1.7e+00
Co60		2.0e-02 +/-	2.0e-02
I129	<	6.1e-01	
Cs137		9.5e-02 +/-	3.0e-02
Eu152	<	1.5e-01	
Eu154		1.5e-01 +/-	7.0e-02
Eu155	<	1.1e-01	
Th232dau		1.9e+00 +/-	4.5e-01
U235	<	2.9e-01	
U238		3.1e+00 +/-	2.9e+00
U238dau		9.0e-01 +/-	1.5e-01
Np237	<	7.2e-02	
Am241	<	7.5e-02	

Total Activity (pCi/gm) 2.2e+01

Sr-90 N/R
Gross Alpha N/R
Gross Beta N/R
AEA N/R

Definitions:

All errors reported at 2 standard deviations

For soils and natural samples, the following applies:

The analysis of U238 is based on the activity of Pa234m

The analysis of Np237 is based on the activity of Pa233

U238dau is the activity of Pb214 and Bi214, short lived daughter products of U238. Equilibrium between parent and daughter products probably does not exist in disturbed materials.

Th232dau is the activity of Ac228, Pb212, and Tl208, short lived daughter products of Th232. Equilibrium between parent and daughter products may not exist in disturbed materials.

Other samples, not containing natural materials, may have inapplicable results for the Th, U, transuranics and daughter products.

N/R means no result or analysis not requested.

Katherine A. Robertson
DeMers 2/11/99

K.A. Robertson-DeMers Date
ERC Radiological Counting Facility

SAMPLE CHECK-IN LIST

Shipping Container ID: ERK 96-11 Chain of Custody # B99-002-72

11. Description of anomalies (include sample numbers): _____

Telephoned To: _____ On 1/1 By _____

Login No.: 20790

**Condition Upon Receipt Variance Report
St. Louis Laboratory**

Client: Richland
Project No: 550-184
Shipper/No: Air borne 5157747 770

Date: 2-26-99 Time: 0830
Initiated by: Mad B
RFA/COC Numbers: 10293

Condition/Variance (Check all that apply):

1. <input type="checkbox"/> Sample received broken/leaking.	8. <input type="checkbox"/> Sample ID on container does not match sample ID on paperwork. Explain: _____
2. <input type="checkbox"/> Sample received without proper preservative. <input type="checkbox"/> Cooler temperature not within $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Record temperature: _____ <input type="checkbox"/> pH _____ <input type="checkbox"/> other: _____	9. <input type="checkbox"/> All coolers on airbill not received with shipment.
3. <input type="checkbox"/> Sample received in improper container.	10. <input type="checkbox"/> Other (explain below): _____
4. <input type="checkbox"/> Sample received without proper paperwork. Explain: _____	
5. <input type="checkbox"/> Paperwork received without sample.	
6. <input type="checkbox"/> No sample ID on sample container.	
7. <input type="checkbox"/> Custody tape disturbed/broken/missing.	

☐ No variances were noted during sample receipt.

Cooler Temperature Upon Receipt: 6°C

Temperature Variance Does Not Affect the Following Analyses: _____

Notes: received 1X 120ml A instead of 250ml that
was state.

Corrective Action:

☐ Client's Name: _____ Informed verbally on: _____ By: _____
☐ Client's Name: _____ Informed in writing on: _____ By: _____
☐ Sample(s) processed "as is".
☐ Comments: _____ If released, notify: _____
☐ Sample(s) on hold until: _____

Sample Control Supervisor Review: (or designate) _____ Date: _____

Project Management Review: Sheila Lounier Date: 2-26-99

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.184

Category: ICP Metals EPA 6010 (TAL)
Method: EPA 6010
Matrix: SOLID

Sample Date : 02/24/99
Receipt Date : 02/25/99
Report Date : 03/11/99

Client ID: BOTXP2

Quanterra ID : 20790-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result Unit	Qual.	Detection Limit	Dilution
Chromium	7440-47-3	QCBLK194656-1	03/02/99	03/03/99	12.0 MG/KG		1.1	1
Lead	7439-92-1	QCBLK194656-1	03/02/99	03/03/99	4.5 MG/KG	B	10.8	1

000011

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.184

Category: ICP Metals EPA 6010 (TAL)
Method: EPA 6010
Matrix: SOLID

Sample Date : 02/24/99
Receipt Date : 02/25/99
Report Date : 03/11/99

Client ID: BOTXP2

Quanterra ID : 20790-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result Unit	Qual.	Detection Limit	Dilution
Chromium	7440-47-3	QCBLK194656-1	03/02/99	03/03/99	94 %REC			1
Lead	7439-92-1	QCBLK194656-1	03/02/99	03/03/99	92 %REC			1

000012

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.184

Category: ICP Metals EPA 6010 (TAL)
Method: EPA 6010
Matrix: SOLID

Sample Date : 02/24/99
Receipt Date : 02/25/99
Report Date : 03/11/99

Client ID: B0TXP2

Quanterra ID : 20790-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Chromium	7440-47-3	QCBLK194656-1	03/02/99	03/03/99	90	%REC			1
Lead	7439-92-1	QCBLK194656-1	03/02/99	03/03/99	93	%REC			1

000013

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.184

Category: Mercury
Method: SW846 7471
Matrix: SOLID

Sample Date : 02/24/99
Receipt Date : 02/25/99
Report Date : 03/11/99

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOTXP2	20790-001	Mercury	7439-97-6	QCBLK194994-1	03/08/99	03/08/99	0.017	MG/KG	UN	0.036	1
BOTXP2	20790-001MS	Mercury	7439-97-6	QCBLK194994-1	03/08/99	03/08/99	129	%REC	N		1
BOTXP2	20790-001MSD	Mercury	7439-97-6	QCBLK194994-1	03/08/99	03/08/99	129	%REC	N		1
NA	QCLCS194994-1	Mercury	7439-97-6	QCBLK194994-1	03/08/99	03/08/99	94	%REC			2
NA	QCBLK194994-1	Mercury	7439-97-6	QCBLK194994-1	03/08/99	03/08/99	0.017	MG/KG	U	0.033	1

000016

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: QUANTERRA_MO_____ Contract: 550.184_____
Lab Code: ITMO_____ Case No.: _____ SAS No.: _____ SDG No.: W02690_____
SOW No.: SW846

[illegible]

Were ICP interelement corrections applied ?	Yes/No	YES
Were ICP background corrections applied ?	Yes/No	YES
If yes - were raw data generated before application of background corrections ?	Yes/No	NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____
Date: _____ Title: _____

1
INORGANIC ANALYSES DATA SHEET

BOTXP2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

[illegible]

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

FORM I - IN

SW-846

00013